

What is claimed is:

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1. An assembly comprising:

a light-base having a concave curved surface forming an archway interior space;

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a plurality of light-generating devices positioned on said light base to shine light into said archway space, each of which is arranged to output light in a lobe that overlaps light lobes of other devices, to form a combined field of light with the other ones of said plurality of light-generating devices.

2. The assembly of claim 1 where said plurality of light-generating devices are arranged
10 to form said field of light that is relatively uniform in intensity on a convex surface.

3. The assembly of claim 2 where said convex surface is convex primarily in two dimensions.

4. The assembly of claim 2 where said intensity on said convex surface is between 10 and 300 mw/cm².

5. The assembly of claim 2 where said relatively uniform light intensity is achieved through lenses which gather light that is generated by said light-generating means to form lobes of light that overlap and thereby combine to form said field of light.

Sub 94
6. The assembly of claim 5 where said relatively uniform light intensity is achieved through directing of said lobes by means of any one or more of the following: individual lenses integrally associated with said light-generating devices; individual lenses positioned in proximity
25 of said light-generating devices; a light-transmitting membrane that includes lenses, positioned in front of said light-generating devices; perturbations in said curved surface that cause said light generating means to be angled; precisely forming said curved surface, interposing pedestals between said light-generating means and said concave curved surface.

7. The assembly of claim 6 where said angling of said light-generating devices is achieved through pedestal means, or concave curvature of said light base in all three spatial dimensions.

Sub 57 8. The assembly of claim 5 where said relatively uniform light intensity is achieved through digital or analog control of electrical energy that powers each of said light-generating devices.

9. The assembly of claim 5 where said relatively uniform light intensity is achieved through use of light-generating devices of different sizes.

10. The assembly of claim 1 where said surface is concave in two dimensions of the three spatial dimensions, and linear in the third spatial dimension.

11. The assembly of claim 1 where said light-generating devices generate light in a spectral range of 300-900 nm.

12. The assembly of claim 1 where said light-generating devices generate light in the spectral ranges 475 +/- 40 nm.

13. The assembly of claim 1 where some of said light-generating devices generate light at one nominal wavelength range, and others of said light-generating devices generate light at another nominal wavelength range.

14. The assembly of claim 1 where each of said light-generating devices includes an associated lens that focuses light generated by the associated light-generating device to form a lobe that is directed at a predetermined angle.

15. The assembly of claim 14 where said lobe has a cone angle of not more than 30°.

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16. The assembly of claim 14 where different ones of said light-generating devices and their associated lenses direct their lobes at different angles with respect to their respective positions on said light-base.

5 17. The assembly of claim 16 where said different angles are achieved through action of the said associated lenses.

18. The assembly of claim 16 where said different angles are achieved through action of angling pedestals.

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19. The assembly of claim 1 where said plurality of light-generating devices form are positioned on said light base in a uniform spatial pattern.

20. The assembly of claim 1 where said light sources are light emitting diodes that are affixed on said light base.

21. The assembly of claim 1 where said light sources are light emitting diodes that are manufactured on a surface that is coupled to said light-base.

22. The assembly of claim 1 where said light-generating devices are light emitting diodes that are grown on a surface that is coupled to said light-base.

23. The assembly of claim 1 where said light-generating devices are light emitting diodes that are grown on said light-base.

24. The assembly of claim 1 where said light-generating devices emit substantially the same light intensity.

25. The assembly of claim 1 where said light-generating devices are manufactured on a plurality of light strips that are mechanically positioned in said light base.

26. The assembly of claim 25 where said light strips are slideably positioned in said light base.

27. The assembly of claim 20 further comprising passages in said light-base that allow air to flow through said passages.

28. The assembly of claim 27 further comprising means for drawing air through said passages in direction opposite direction of light output of said light emitting diodes.

29. The assembly of claim 1 further comprising positioning means coupled to said light-base for placing said assembly so that said curved surface is at a preselected position relative to teeth of a patient.

30. The assembly of claim 29 where said positioning means includes a mechanical positioning means.

31. The assembly of claim 29 where said positioning means is a bite block.

32. The assembly of claim 29 where said positioning means includes at least one light source that emits light in a range visible to humans, which light source includes a lens to focus light generated by said light source at a preselected point in space.

33. The assembly of claim 29 where said positioning means includes at least one pair of light sources that emit light in a range visible to humans, which light sources form two beams that meet at a preselected point in space.

Sub a10734

33. The assembly of claim 31 where said pair of light sources are positioned and directed to form two light beams that meet at a point that is at a predetermined distance from said curved surface.

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34. The assembly of claim 1 where said light-base is constructed of a material that is flexible, to allow changing curvature of said curved surface.

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35. The assembly of claim 1 further comprising a light blocking attachment coupled to said light-base.

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36. The assembly of claim 35 where said light blocking attachment is adapted to block light in the wavelength range of said light sources.

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37. An assembly for placing in front of a patient's teeth when used in connection with whitening teeth comprising:

a light-base having a generally concave curved surface;

a plurality of light-generating devices positioned on said surface, each of which is arranged to output light in a lobe that is directed to additively contribute to a field of light with the other ones of said plurality of light-generating devices, which field of light is at surface of said teeth.

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38. The assembly of claim 37 where said light-generating devices produce a blue light.

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39. The assembly of claim 37 where said light is approximately centered at 475 nm.

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40. The assembly of claim 37 where said light-generating devices are LEDs that produce a blue light.

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41. The assembly of claim 37 where said lobes of said light-generating device overlap at said teeth.

Sub 68 43
5 42. An assembly comprising:

a light-base;

a plurality of light-generating devices positioned on said light base, each of which is arranged to generate a lobe of light, and the light-generating devices are arranged to have their respective lobes of light overlap at a predetermined distance from said light base, at which distance the light from said light-generating devices is in the range of 10 and 300 mw/cm².

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43. The assembly of claim 42 where said lobes of light overlap to form a field of light that is approximately the size of one tooth.

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44. The assembly of claim 42 where said lobes of light overlap to form a field of light that uniformly covers a number of teeth.

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45. The assembly of claim 42 where said lobes of light overlap to form a field of light that uniformly and concurrently covers upper eight and lower eight teeth of a patient.

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46. The assembly of claim 42 where said light-generating devices generate light in the blue range.

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47. The assembly of claim 42 where said light-generating devices are LEDs that generate light in the spectral range 300-900 nm.

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48. A portable tooth whitening device comprising:
one or more light source;
at least one optical output;
projection means for holding and positioning the optical output outside of a patient's

mouth in a manner which provides approximately simultaneous and uniform illumination of a patient's from teeth by the optical output;

connection means for connecting the light source to the optical output; and a mobile support structure on which the light is attached.

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A portable tooth whitening device as in claim 1, wherein the mobile support structure is on wheels.

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A portable tooth whitening device as in claim 1, wherein the connection means is at least one fiber optic bundle positioned by an articulated arm capable of positioning the output at any angle from horizontal to vertical.